

REMARKS/ARGUMENTS

STATUS OF CLAIMS

Applicant respectfully requests reconsideration of pending Claims 20-35 and 87 in light of the following remarks.

CLAIM REJECTIONS – 35 U.S.C. §102

Independent Claim 20, 24, and 28

Claims 20, 24, and 28 stand rejected under 35 U.S.C. §102(b) as being anticipated by United States Patent No. 6,481,973 issued to Struthers (hereinafter “Struthers”). Claims 20, 24, and 28 each specify “shutting down the motor if the motor does not operate within operational limits while being driven in the limp mode.”

Struthers discloses a method of operating a variable speed submersible pump. The pump includes a motor 12 and a controller 22 which controls the motor 12 and the operation of the pump. Struthers also discloses three conditions that cause the controller 22 to shut down the motor 12: when the pump overheats, when the tank is dry, and when the pump is clogged. *Struthers*, col. 3, lines 1-13; col. 7, line 41 to col. 8, line 61, Figs. 5A and 5B. If the pump is overheating or if the tank is dry, Struthers discloses shutting the motor 12 of the pump off immediately, without any prior modification to the motor inputs. As a result, for these two conditions, the pump of Struthers never enters a “limp mode.”

For the third condition when the pump is clogged, Struthers discloses implementing a number of different operations, culminating with running the pump at the highest speed possible for five minutes, before shutting off the pump. *Id* at col. 7, line 41 to col. 8, line 61, Figs. 5A and 5B. Running the pump at the highest speed possible cannot be construed as operating in a “limp mode.” Since the pump is shut down only after running the pump at the highest possible speed, the pump in Struthers is not shut down “while being driven in the limp mode,” as specified by Claims 20, 24, and 28.

Accordingly, Struthers does not disclose “shutting down the motor if the motor does not operate within operational limits while being driven in the limp mode,” as specified by Claims 20, 24, and 28. Therefore, independent Claims 20, 24, and 28 and dependent Claims 21-23, 25-27, and 29-31 are allowable.

Dependent Claims 21-23, 25-27, and 29-31

Claims 21-23, 25-27, and 29-31 stand rejected under 35 U.S.C. §102(b) as being anticipated by Struthers. Claims 21-23, 25-27, and 29-31 depend from independent Claims 20, 24, and 28 and are therefore allowable for the reasons set forth above with respect to Claims 20, 24, and 28. Claims 21-23, 25-27, and 29-31 also include additional patentable subject matter not specifically discussed herein.

Independent Claim 32

Claim 32 stands rejected under 35 U.S.C. §102(b) as being anticipated by Struthers. Claim 32 specifies “reducing at least one of an output voltage provided to the motor and an operating frequency of the motor if the temperature is greater than the limp temperature limit setting in order to drive the motor in a limp mode; and shutting down the motor if the motor does not operate within operational limits while being driven in the limp mode.”

Struthers discloses a temperature sensor for detecting if the motor 12 is overheating. *Struthers*, col. 6, lines 15-17. In Struthers, if the controller 22 detects that the pump is overheating, the controller 22 immediately stops the pump. *Id.* at col. 7, lines 41-43, Figs. 5A and 5B. At no time does the pump of Struthers enter a “limp mode” based on a temperature being greater than a temperature limit.

Accordingly, Struthers does not disclose “reducing at least one of an output voltage provided to the motor and an operating frequency of the motor if the temperature is greater than the limp temperature limit setting in order to drive the motor in a limp mode; and shutting down the motor if the motor does not operate within operational limits while being driven in the limp

mode,” as specified by Claim 32. Therefore, independent Claim 32 and dependent Claims 33-35 are allowable.

Dependent Claims 33-35

Claims 33-35 stand rejected under 35 U.S.C. §102(b) as being anticipated by Struthers. Claims 33-35 depend from independent Claim 32 and are therefore allowable for the reasons set forth above with respect to Claim 32. Claims 33-35 also include additional patentable subject matter not specifically discussed herein.

Independent Claim 87

Claim 87 stands rejected under 35 U.S.C. §102(b) as being anticipated by Struthers. Claim 87 specifies “measuring a parameter including at least one of an actual pressure, a bus current, a bus voltage, a line current, a temperature of a heat sink, and a speed of the motor; determining if the parameter is outside of a range; executing a recovery operation if the parameter is outside of a range,...and shutting down the motor if the recovery operation fails.”

Struthers discloses executing a recovery operation if the pump is “clogged,” which results in shutting down the motor 12 if the recovery operation fails. The controller 22 can detect a clog only when the motor 12 develops “an unacceptably high torque.” *Id.* at col. 3, lines 1-13; col. 7, line 60 to col. 8, line 61; Figs. 5A and 5B. Accordingly, Struthers only discloses executing a recovery operation when the controller 22 detects an unacceptably high torque. Struthers does not disclose executing a recovery operation by the controller 22 detecting any one of the parameters specified by Claim 87, namely an actual pressure, a bus current, a bus voltage, a line current, a temperature of a heat sink, or a speed of the motor.

Accordingly, Struthers does not disclose “measuring a parameter including at least one of an actual pressure, a bus current, a bus voltage, a line current, a temperature of a heat sink, and a speed of the motor; determining if the parameter is outside of a range; executing a recovery operation if the parameter is outside of a range,...and shutting down the motor if the recovery operation fails,” as specified by Claim 87. Therefore, independent Claim 87 is allowable.

CLAIM REJECTIONS – 35 U.S.C. §103

Independent Claim 20

Claim 20 stands rejected under 35 U.S.C. §103(a) as being unpatentable over United States Patent No. 4,767,280 issued to Markuson et al. (hereinafter “Markuson”) in view of Struthers. Claim 20 also stands rejected under 35 U.S.C. §103(a) as being unpatentable over Struthers in view of Markuson. Regardless of whether Markuson or Struthers is used as the primary reference in the rejection under 35 U.S.C. §103(a), neither Markuson or Struthers teaches or suggests “reducing at least one of an output voltage provided to the motor and an operating frequency of the motor if the bus current is greater than the limp current limit setting in order to drive the motor in a limp mode; and shutting down the motor if the motor does not operate within operational limits while being driven in the limp mode,” as specified by Claim 20.

Markuson teaches a controller 10 that monitors power consumption of a pump motor 2. The controller 10 provides indications of operating conditions for the pump motor 2. The controller can also measure other conditions, such as flow and temperature. When the controller 10 detects an overload or an underload condition, the controller 10 switches an appropriate indicator light on and starts a timer. Markuson also teaches using the controller 10 to control the operation of the pump motor 2 based on input from a power company demand limit control system. *Markuson*, col. 4, lines 4-7; col. 5, lines 3-11; col. 6, lines 37-41; col. 6, line 59 to col. 7, line 44. In addition, Markuson teaches that service personnel react to the overload indications before the pump becomes stuck and the motor kills. *Id.* at col. 5, lines 33-53. Markuson does not teach entering a limp mode when a bus current is greater than a threshold or shutting down the motor while being driven in the limp mode.

Struthers does not cure the deficiencies of Markuson. As discussed above, the pump of Struthers is shut down only after running the pump at the highest possible speed. As a result, Struthers does not teach shutting down the pump “while being driven in the limp mode.”

Accordingly, neither Markuson nor Struthers teaches or suggests the subject matter of Claim 20. Therefore, independent Claim 20 and dependent Claims 21-23 are allowable.

Independent Claim 24

Claim 24 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Markuson in view of Struthers. Claim 24 also stands rejected under 35 U.S.C. §103(a) as being unpatentable over Struthers in view of Markuson. Regardless of whether Markuson or Struthers is used as the primary reference in the rejection under 35 U.S.C. §103(a), neither Markuson or Struthers teaches or suggests “reducing at least one of an output voltage provided to the motor and an operating frequency of the motor if the bus voltage is less than the programmed threshold in order to drive the motor in a limp mode; and shutting down the motor if the motor does not operate within operational limits while being driven in the limp mode,” as specified by Claim 24.

As discussed above, Markuson does not teach entering a limp mode when a bus voltage is greater than a threshold or shutting down the motor while being driven in the limp mode. Struthers does not cure the deficiencies of Markuson. As discussed above, Struthers does not teach shutting down the pump “while being driven in the limp mode.”

Accordingly, neither Markuson nor Struthers teaches or suggests the subject matter of Claim 24. Therefore, independent Claim 24 and dependent Claims 25-27 are allowable.

Independent Claim 28

Claim 28 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Markuson in view of Struthers. Claim 28 also stands rejected under 35 U.S.C. §103(a) as being unpatentable over Struthers in view of Markuson. Regardless of whether Markuson or Struthers is used as the primary reference in the rejection under 35 U.S.C. §103(a), neither Markuson or Struthers teaches or suggests “reducing at least one of an output voltage provided to the motor and an operating frequency of the motor if the line current is less than the programmed threshold in order to drive the motor in a limp mode; and shutting down the motor if the motor does not operate within operational limits while being driven in the limp mode,” as specified by Claim 28.

As discussed above, Markuson does not teach entering a limp mode when a line current is greater than a threshold or shutting down the motor while being driven in the limp mode.

Struthers does not cure the deficiencies of Markuson. As discussed above, Struthers does not teach shutting down the pump “while being driven in the limp mode.”

Accordingly, neither Markuson nor Struthers teaches or suggests the subject matter of Claim 28. Therefore, independent Claim 28 and dependent Claims 29-31 are allowable.

Independent Claim 32

Claim 32 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Markuson in view of Struthers. Claim 32 also stands rejected under 35 U.S.C. §103(a) as being unpatentable over Struthers in view of Markuson. Regardless of whether Markuson or Struthers is used as the primary reference in the rejection under 35 U.S.C. §103(a), neither Markuson or Struthers teaches or suggests “reducing at least one of an output voltage provided to the motor and an operating frequency of the motor if the temperature is greater than the limp temperature limit setting in order to drive the motor in a limp mode; and shutting down the motor if the motor does not operate within operational limits while being driven in the limp mode,” as specified by Claim 32.

As discussed above, Markuson does not teach entering a limp mode when a temperature is greater than a threshold and, therefore, shutting down the motor while being driven in the limp mode. Struthers does not cure the deficiencies of Markuson. As discussed above, Struthers does not teach shutting down the pump “while being driven in the limp mode.”

Accordingly, neither Markuson nor Struthers teaches or suggests the subject matter of Claim 32. Therefore, independent Claim 32 and dependent Claims 33-35 are allowable.

Independent Claim 87

Claim 87 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Markuson in view of Struthers. Claim 87 also stands rejected under 35 U.S.C. §103(a) as being unpatentable over Struthers in view of Markuson. Regardless of whether Markuson or Struthers is used as the primary reference in the rejection under 35 U.S.C. §103(a), neither Markuson or Struthers teaches or suggests “measuring a parameter including at least one of an actual pressure, a bus current, a bus voltage, a line current, a temperature of a heat sink, and a speed of the motor; determining if the parameter is outside of a range; executing a recovery operation if the parameter is outside of a range,...and shutting down the motor if the recovery operation fails,” as specified by Claim 87.

Markuson teaches measuring power, temperature, oil flow, and other parameters. *Markuson*, col. 6, lines 37-41. Markuson does not teach measuring pressure, current, or voltage. Markuson also does not teach executing a recovery operation or shutting down the motor if the recovery operation fails. Instead, Markuson teaches that service personnel react to an indicator light. *Id.* at col. 5, lines 35-52.

Struthers does not cure the deficiencies of Markuson. As discussed above, Struthers does not teach executing a recovery operation if an actual pressure, a bus current, a bus voltage, a line current, a temperature of a heat sink, or a speed of the motor is out of a range. In addition, Struthers teaches away from entering a recovery operation if a temperature is out of range. If the controller 22 of Struthers detects a high temperature, the controller 22 always shuts down the pump immediately. *Struthers*, col. 3, lines 41-43.

Accordingly, neither Markuson nor Struthers teaches or suggests the subject matter of Claim 87. Therefore, independent Claim 87 is allowable.

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CONCLUSION

In light of the above, Applicant respectfully requests reconsideration and allowance of pending Claims 20-35 and 87.

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